

UNITED STATES GEOLOGICAL SURVEY

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Authorized by: SC

Date: 6/20/13

ENVIRONMENTAL IMPACT ANALYSIS

THE ANACONDA COMPANY
P-9-2 ADIT MINE PROJECT - PROPOSED CHANGES
VALENCIA COUNTY, NEW MEXICO

Prepared
by
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CONFIDENTIAL

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Environmental Impact Analysis
Proposed Mining Plan Changes
P-9-2 Adit Mine Project
The Anaconda Company
Laguna Tribal Uranium Lease No. 4
Pagate, New Mexico

I. Proposed Action

The proposed action consists of changes in the approved mining plan for the P-9-2 Adit Mine Project which was submitted under the provisions of 30 CFR Part 231.10(c) of the Federal regulations by The Anaconda Company on September 19, 1973. The approved mining plan is for a small underground uranium mining operation near the southeast margin of the company's large Paguate open-pit mine on Laguna Tribal lease No. 4; and, as such, is a reactivation of a former mining operation utilizing new methods. It consists of three separate adits laterally advanced from near the bottom of the small mined out P-9-1 open-pit to develop the multilayered P-9-2 group of 13 small southeasterly trending tabular ore bodies for extraction with a modified sub-level room and pillar stoping method.

The proposed changes in the plan, submitted October 19, 1974, under the provisions of 30 CFR Part 231.10(e), provide for the addition of two more adit mines to the Project in order to develop and extract the ore reserves in the P-3 and P-11 areas located north and east of the P-9-1 pit.

These adits would provide for the development and extraction of about 81,000 tons of average grade uranium ore (uraniferous sandstone) that is contained in 17 small north-south trending tabular ore bodies lying within the Jackpile sandstone unit of the Jurassic Morrison Formation at a depth of about 150 feet below the land surface. They extend north and east from the crest limit of the small P-9-1 open-pit for a distance of about 1000 feet. The two adits would be driven from near the bottom of the 150-foot deep pit into its north and east walls. The dimensions of the large pit are 9,700-feet long, 970-feet wide, and 125-feet deep; the smaller pit is 950-feet long, 820-feet wide, and 150-feet deep.

The adits would be driven with a mechanical mining machine whenever possible, and by conventional drilling and blasting when necessary.

Ore extraction would be accomplished through raises from the trackless adit levels by sub-level room and pillar stoping with conventional mining equipment, and by longwall stoping with a mechanical mining machine when feasible.

The surface plant facilities for the three ongoing P-9-2 adit mine operations would also be used by the P-3 and P-11 adit mines. The only additional major items of surface equipment required would be four electrically-powered axial flow ventilating fans, i.e., 1 - 35,000 cfm, 60 hp fan for the P-3 area workings and 2 - 35,000 cfm, 60 hp and 1 - 35 hp fans for the P-11 area workings. No additional major items of underground equipment would be required because those in present use would be interchangeably employed in all five of the adit mines as an integrated operation.

Driving of the two adits would be commenced upon approval of the proposed changes in the P-9-2 plan, and the estimated 100 tpd mining operation would probably be completed by April 1976.

The ore from this small operation would supplement that being produced from the various underground operations on Tribal lease No. 4 and the nearby Paguate and Jackpile open-pit mines on adjoining Tribal lease No. 1. Currently, more than 2,400 tpd of relatively high grade ore are being transported about 50 miles by rail (AT&SF) to Grants, New Mexico, where about 90% of the ore is concentrated in the company's 3,500 tpd acid-leach mill and the remainder in United Nuclear - Homestake Partner's 3,500 tpd carbonate-leach custom mill.

Location and Natural Setting

The involved lands include about 20 acres within T. 10 N., R 5 W., Section 4: NW $\frac{1}{4}$, NMPM, Valencia County, New Mexico. They are located in the Laguna Mining District about 8.5 miles north of Laguna, New Mexico, on the Laguna Indian Reservation. The tract is situated on the gently rolling terrain atop North Oak Canyon Mesa about 1/2 mile north of State Highway 275 at an elevation of nearly 6,100 feet above sea level, (see attached Map "A".)

The following geologic section of the mine site was obtained from drill hole data supplied by Rudi Forham, Chief Geologist, Anaconda Copper Company.

- 0 - 90-feet - alternating bands of shale
- 90 - 96-feet - oxidized and highly siliceous sandstone
- 96 - 256-feet - flat-lying, yellowish-grey, medium-grained alluvial sandstone; with massive interbedded sandstone in the upper one-third of the unit.

(For a more detailed geologic report, see attached Conservation Division geologist memorandum December 10, 1973.)

The climate is semiarid, the annual precipitation ranging from 4 to 18 inches and averaging about 9 inches per year. The summers are generally hot, the winters moderately cold and the mean yearly temperature is about 53° F.

No sizable natural drainageways are present on the tract, and all surface water run off flows into the open-pit workings where it is impounded and evaporated. Drill hole data indicate the absence of ground water well below them. The thin (12 inches), sandy mantle of top soil supports a sparse growth of native grasses, cacti and desert shrubs spotted by occasional juniper trees. Past drilling activities have impressed the area with many drilling sites and a network of access roads.

All of the leased lands are used for mining purposes with the exception of a small centrally located housing area for about 30 key mine employees on Tribal lease No. 1 that is well removed from the surface mining activities.

The property is posted and fenced at all points of easy access, and a security guard station on the principal access road is manned 24 hours a day.

The Laguna Indian Village of Paguate (1,253 pop. 1968 censuses) overlooks the leased area from an elevated site about 1 mile northwest of the planned project. About 90 percent of the company's 372 mine operations personnel are Laguna Indians, and nearly 20 percent of them reside in Paguate.

There are no Indian ruins, burial or significant religious sites situated on or near the leased lands according to either the Bureau of Indian Affairs, Southern Pueblos Agency, or company sources. Recreation sites, parks, monuments, historical sites and unique physical features are also reported to be absent. The surrounding scenic area would not be affected by the proposed mining installations since all mining facilities are either underground or situated on or near the floor of an open-pit excavation well below the existing land surface. Only the ventilating fan installations for three of the six ventilation shafts would rise to the height of about 8 feet above the ground.

Owing to the intense surface mining activity on a two-shift basis and the nonexistence of surface water in the general vicinity of the P-9-2 mine site, wildlife resources on and near the project area are limited to a number of small commonplace rodents, lizards, insects, arachnids, and transient small birds. The small area of the original land surface to be affected by the plan, less than 4 acres, and the shallow depth to which it would be disturbed is expected to provide a minor impact to such resources. No endangered species are known to be present.

Effect on The Environment

All of the surface plant facilities, the 2 adit portals and the estimated 23,000 ton waste dump would be contained within the small mined out open-pit. Accordingly, damage to the involved lands would be limited to that resulting from the construction of 1000-feet of 15-foot wide access roads and the preparation of 1/2 acre drilling sites for six ventilation bore holes located away from all pit workings. The necessary grading and leveling of the land surface with a motorized grader would disturb the top soil to a depth of about 6 inches with the consequent destruction of the vegetation on a total area of about 3.2 acres in size.

There are no apparent geologically-related environmental hazards associated with the proposed changes. The intended methods of ground support in the mine are adequate to prevent surface subsidence above the underground workings. Mined-out areas would be waste-filled if necessary to prevent excessive caving.

The absence of ground water and the planned diversion of any surface run off water to a small collection pond on the floor of the small open-pit will assure that what water occurs in the underground workings would consist of the minor quantity to be used in pneumatic drilling.

Sanitation facilities would include chemical toilets with waste disposal provided for in established sewage lagoons. Suitable change house facilities are available at nearby machine shops and mine office buildings for the open-pit operations.

The possibility of any significant amount of air pollution would be remote because of the absence of any sizable contributory sources in either the surface plant installations or the underground workings. The formation of road dust from ore and waste haulage on the surface would be kept to an acceptable minimum by spraying water from the collection ponds on the roads with truck mounted sprinklers. Radioactive gas and particulate materials in the mine would be removed with an efficient ventilating system in compliance with MESA standards and harmlessly dissipated in the atmosphere.

No unusual health or safety problems would be expected in any phase of the operations.

Nearby Paguate village and its inhabitants should not be affected by the mining operations, nor should the tribal economy be changed since the ore therefrom is needed to maintain the present production schedule.

There has been no adverse comment or controversy generated by the proposed action.

Alternatives To The Proposed Action

No other feasible mining method or modification of the proposed method would reduce the possible damage to the environment. Any form of open-pit mining would be uneconomical and would also disturb a much greater area of the land surface. Any modification of the planned method could only result in further surficial damage from the necessary construction of several production shaft sites.

Unavoidable Adverse Environmental Effects

The proposed action would result in the temporary alteration of about 3.2 acres of land surface and the removal of all vegetation thereon during the construction of the access roads and the six drilling sites.

Mitigative Measures

Upon completion of operations, all disturbed or denuded areas would be rehabilitated by the lessee to the satisfaction of the Agency Superintendent as provided for under Section 16 of the lease.

The top soil would be replaced if necessary, and the vegetative cover would be reestablished by cultivation and reseeded as prescribed by the Bureau of Indian Affairs. Adequacy of the work and the results would be determined through post-project inspections by an authorized representative of the BIA, Southern Pueblos Agency.

In addition, all mine openings would be filled and/or sealed after written approval has been issued to the lessee by the Area Mining Supervisor. The work would be accomplished according to the Supervisor's recommendations to the Agency Superintendent subject to his approval as prescribed in the lease. This post-project work would be periodically inspected for adequacy during its execution by the monitoring mining engineer who would submit reports to the Mining Supervisor and the Agency Superintendent regarding its acceptability.

Determination

It is determined that the plan does not constitute a major Federal action significantly affecting the quality of the human environment in the sense of NEPA, Section 102(2)(c).

Philip B. Mudgett

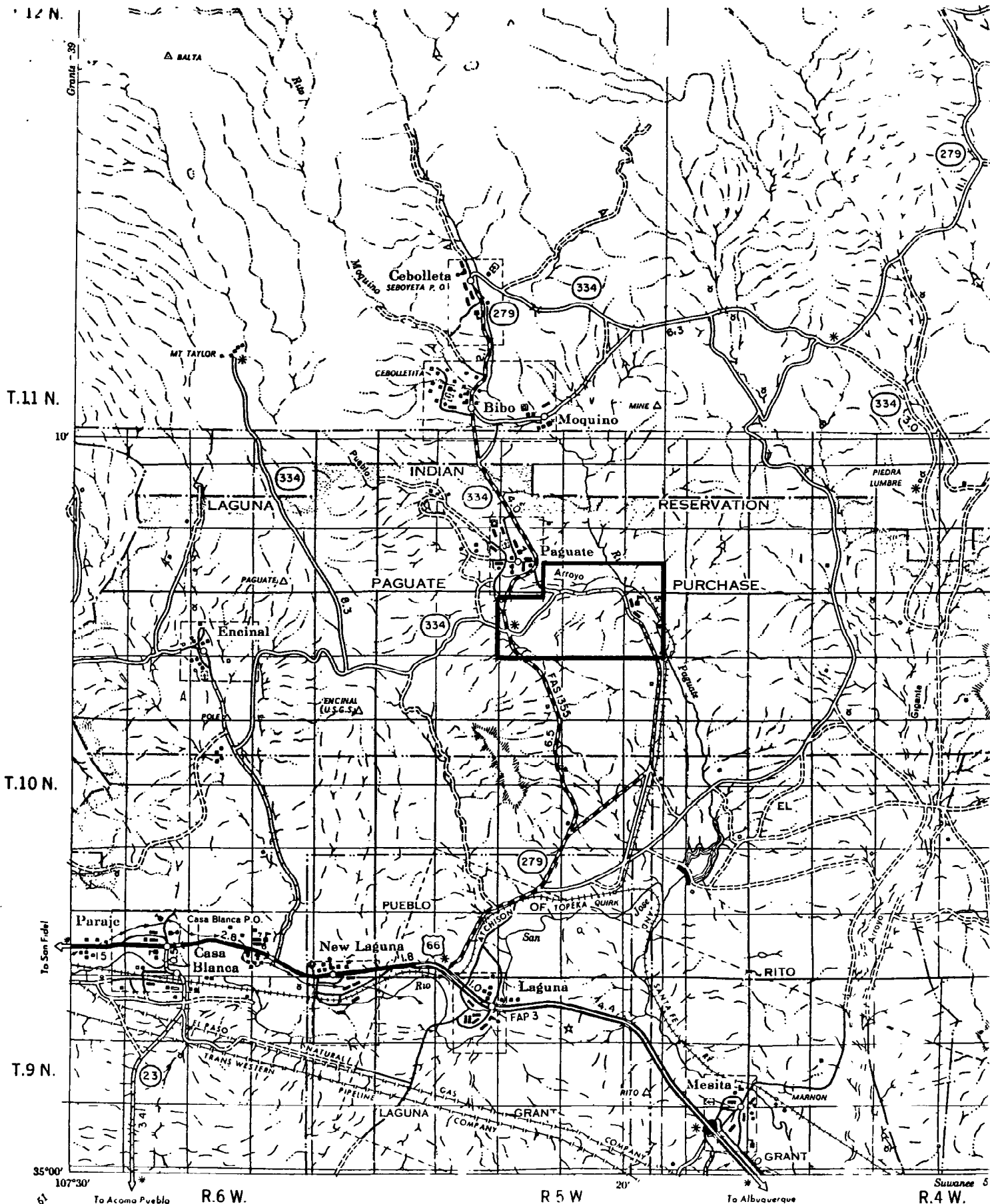
Philip B. Mudgett
Mining Engineer
U. S. Geological Survey

SUMMARY OF ENVIRONMENTAL IMPACT EVALUATION

PROPOSED CHANGES IN MINING PLAN
for
THE ANACONDA COMPANY'S
P-9-2 UNDERGROUND URANIUM MINE
VALENCIA COUNTY, NEW MEXICO

PROPOSED ACTION

| | PROPOSED ACTION | | | | | |
|--------------------------|--|--|--|---|---|---------|
| | Construction | Pollution | Exploration or Mining | Transport Operations | Accidents | Other |
| | Roads, bridges, airports, railroads Transmission lines, pipelines Dams and impoundments Structures (mine buildings, etc.) Others | Burning, noise, dust Liquid effluent discharge Solid waste control and disposal Others (toxic gases, noxious gases, etc.) | Exploration (drilling, trenching) Surface Excavation (tunnel, stripmining, etc.) Storage (product, waste, spoil) Mineral processing (ext. facilities) Others | Trucks, railroads Pipelines, conveyors Others | Spills and leaks, explosions Landslides Operational failure | |
| Existing Conditions: | | | | | | |
| Forestry | | | | | | |
| Grazing | | | | | | |
| Wilderness | | | | | | |
| Agriculture | | | | | | |
| Residential - Industrial | | | | | | |
| Mineral Extraction | | | / | / | | |
| Oil and Gas | | | | | | |
| Recreation | | | | | | |
| Scenic Views | | | | | | |
| Parks, Reserves | | | | | | |
| Monuments | | | | | | |
| Historical Sites | | | | | | 8 miles |
| Unique Physical Features | | | | | | |
| Birds | | | / | | | |
| Land Animals | | | / | | | |
| Fish | | | | | | |
| Endangered Species | | | | | | |
| Trees, Grass, Etc. | / | | / | | | |
| Surface Water | | | / | / | | |
| Underground Water | | | | | | |
| Air Quality | / | / | | | | |
| Erosion | | | | | | |
| Other | | | | | | |
| Effect on Local Economy | | | / | | | |
| Safety and Health | | | / | | | |
| Others | | | | | | |



Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 34°N North American Datum

Map "A"
Location Map
for

The Anaconda Company's
P-9-2 Underground Uranium Mine

Scale $\frac{1}{126720}$ or 1 In.
1 1/2 0 1
STATUTE MILE



United States Department of the Interior

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DEC 12 1973

Drawer 1857
Roswell, New Mexico 88201

December 10, 1973

U. S. Geological Survey
Carlsbad, N.M.

Memorandum

To: Area Mining Supervisor, Carlsbad, New Mexico
Through: Area Geologist, Roswell, New Mexico
From: Geologist, Roswell, New Mexico
Subject: Geology of sec. 4, T. 10 N., R. 9 W., N.M.P.M., New Mexico -
location of the Anaconda Company "P-9-2 Adit Mine Project".

The subject area is valuable for oil and gas, but the nearest production is about 50 miles to the north. No oil wells of record have been drilled in section 4. The land is not valuable for coal, but there may be coal in the Dakota Formation, at depth.

Structure.--The rocks in this section dip to the east. The structure lines shown on the geologic map (attached) are drawn on the Dakota Formation. The dip is about 1,000 feet per mile, or about 10 degrees. No major faults have been noted.

Ground water.--The principal aquifers which may be encountered are the Westwater Canyon Member of the Morrison Formation, the Dakota Sandstone and alluvium (and basalt if present). The water of best quality is in the Alluvium and basalt to the west of this area. Mining will probably not affect the quality of ground water since the main source of good water comes from the San Andres Formation which is below the mine area.

Drainage.--Drainage is south to the Rio San Jose.

References:

NMBM Memoir 15, page 219 (water)
U.S. Geol. Survey map GQ 681
U.S. Geol. Survey map GQ 682

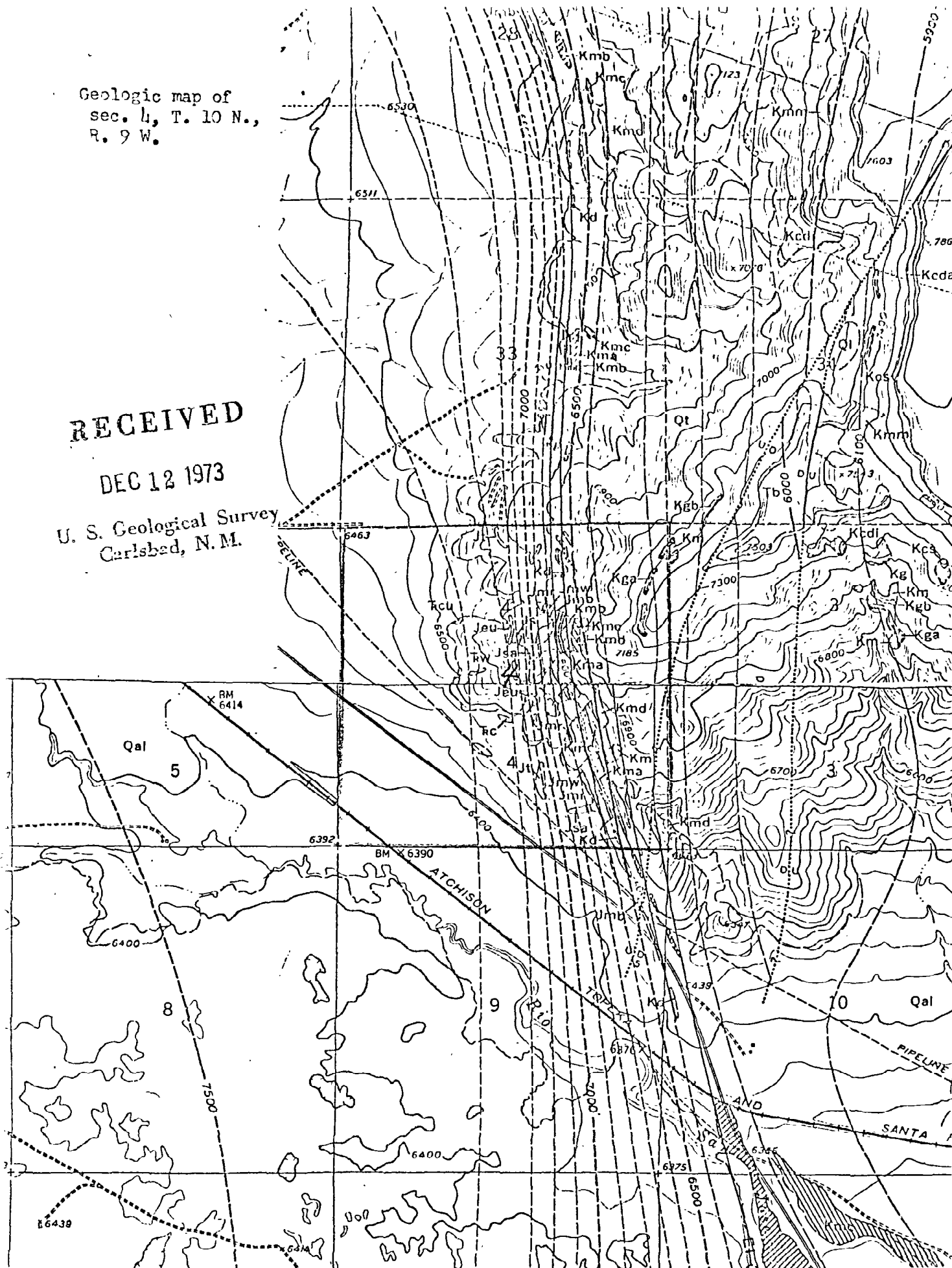
Elmer D. Patterson
Elmer D. Patterson

Geologic map of
sec. 4, T. 10 N.,
R. 9 W.

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DEC 12 1973

U. S. Geological Survey
Carlsbad, N. M.



GEOLOGIC COLUMN

Upper Cretaceous rocks.

Mancos Shale.

- Krm - Mulatto Tongue
Shale and sandstone,
210 to 240 feet thick.
- Km - Main body of Mancos Shale.
Shale and sandstone. Inter-
fingers with Gallup Sandstone
20 to 450 feet thick.
- Kmd - 80 to 120 feet sandstone
and shale.
- Kmc - 60 to 100 feet. "
- Kmb - 60 to 100 feet "
- Kma - 20 to 40 feet "

Mesaverde Group

Crevasse Canyon Fm.

- Kcg-Gibson coal mbr.
- Kcd-Dalton Sandstone mbr. 125 ft.
- Kcs-Stray sandstone mbr. 35-50 ft.
- Kcd-Dilco Coal mbr. 150-180 ft.

Kg-main body of Gallup Sandstone
25 to 50 ft.

Kgb-upper tongue. 25 to 65 ft.

Kga-lower tongue. 10 to 35 ft.

Lower Cretaceous rocks.

- Kd - sandstone and shale with
some coal beds.
40 to 70 feet thick.

Upper Jurassic rocks.

- Jmb - Brushy Basin Member of
Morrison Fm. Sandstone
40 to 120 feet thick.
- Jmw - Westwater Canyon Member -
sandstone- 40 to 110 feet.
- Jmr - Recapture Member - siltstone
and sandstone. 20 to 130 ft.
- Jsa - Yellow Sandstone - (Zuni-Bluff,
of Cow Springs) sandstone.
320 to 340 feet.
- Js - Summerville Formation, sandstone,
siltstone, and claystone. 60
to 140 feet thick.
- Jt - Todilto Limestone. 10 to 40 ft.
- Jeu - upper sandy member of Entrada
Sandstone.
- Jem - medial silty member of Entrada.
about 40 ft.

Upper Triassic Rocks.

- Trw. Lukachukai Member of Wingate
Sandstone. 100 to 115 ft.
- Trcu-Upper member of Chinle Fm.
Siltstone and limestone.
330 feet.
- Trcm.-Middle member - siltstone,
Trcs-Sohsela Sandstone bed of Petrified
Forest Member, sandstone and
claystone.
- Trcl-Lower member of Chinle Fm.